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Radon Reduction in Residences

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What is Radon?

Radon is a colorless, odorless, tasteless gas created when uranium in soil and rock breaks down. The radon rises up through the soil and then dissipates into the air. Radon becomes a concern when it gets into homes through cracks and openings in and around the foundation. Inside a home the radon can accumulate. When levels are high enough radon is inhaled and may increase the risk of lung cancer. It is estimated that radon may be linked to any where from 5,000 to 20,000 lung cancer deaths per year in the United States.

How Do You Find Out The Radon Level In Your Home?

You can easily test your own home for radon. Radon tests are simple and relatively inexpensive. Beware of door-to-door or phone salespeople who try to pressure or frighten you. Stick with EPA-approved devices purchased from an independent source who will not profit from telling you your home has high levels of radon. The Nebraska State Health Department has a list of registered testing firms who sell reliable and reasonably priced radon test kits.

Through the testing procedure you will expose the test kit to the air in your home (usually in the lowest living level of the house). The length of the test can range from a few days to a year and will depend on the type of detector used. Upon completion of the test it is mailed to the laboratory for analyses. The results will be sent back to you. The level of radon in one home may vary considerably from neighbor to neighbor so it is important for you to take readings for your home.

Reducing Radon In Your Home — Radon Mitigation

Removing radon from a home and preventing new radon from entering a home is called radon mitigation. When and what you need to do to reduce the radon in your home will depend on the level of radon detected. Radon mitigation should only be done after long term testing has been done to confirm high radon levels present in the home.

Radon levels are measured in picocuries per liter (pCi). If annual average radon levels in your home are low (less than 4 pCi/l) you might only need to air out the basement to improve air quality. If the readings are in a medium range (4-20 pCi/l) you have up to a few years to make the changes before the effects of radon become a severe risk. If your readings are high (20-200 pCi/l) you should reduce the radon levels in your home as soon as possible.

Most home owners should not try to make major adjustments by themselves. Radon problems should be taken care of by reputable contractors properly trained and approved by the EPA. The contractor should not be involved with the first testing process. Find a certified radon contractor. As with any large home improvement project get at least two estimates for the work to be done.

You can find out more by obtaining two EPA booklets from the Nebraska State Health Department. A *Citizen's Guide to Radon* and *Radon Reduction Methods — A Homeowner's Guide* are free of charge.

There are a few general areas to consider in radon mitigation. First seal entry routes into the house. These routes usually include areas in the basement where the foundation comes in contact with the soil. Cracks in the walls and floor and openings around utility pipes and wires should be sealed with polyurethane caulk. Sump pits should be covered and sealed, and exposed dirt should be covered with concrete.

A second area of concern is the air pressure of the home. If the air pressure within the house is below the soil pressure you may actually be drawing radon into your home. Increasing outside air can help replace the air pulled out of the home by exhaust fans and clothes dryers.

Changing the air pressure may be as simple as opening windows on all sides of the house if the weather permits. Crawl spaces below the house can also be ventilated if the weather is not a factor. In Nebraska it is important to protect any plumbing pipes that could freeze if exposed to cold temperatures. Cold weather makes this type of ventilation a temporary measure and not a permanent solution.

If radon is still coming in from below the house after cracks and openings have been sealed, you may need to have a sub-slab ventilation system installed. Even for serious problems, a sub-slab system can draw radon away from the house using a pipe and fan system which exhausts the gas to the outside air where it is safely diluted.

Radon mitigation should not be too expensive for most home owners. The cost of making repairs to reduce radon depends on how the home was built and the extent of the radon problem. Every home will be different, but most homes can be fixed for approximately \$500 - \$2000 which is similar to other home repairs and improvements.

Radon Risk Evaluation Chart

<i>pCi/l</i>	<i>Comparable exposure level</i>	<i>Comparable risk</i>
200	1000 times average outdoor level	4 pack-a-day smoker
100	100 times average indoor level	20,000 chest x-rays per year
20	100 times average outdoor level	2 pack-a-day smoker
4-2	10 times average outdoor level	200 chest x-rays per year

Information Sources

- *A CITIZEN'S GUIDE TO RADON — What it is and what to do about it.* United States Environmental Protection Agency, August 1986
- *Radon Reduction Methods — A Homeowner's Guide.* United States Environmental Protection Agency, August 1986
- US News and World Report, September 26, 1988 p.62-63.
- ACHP Appendix J

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